

Technical Requirements for the Development of Virtual Museum of Canada (VMC) Exhibits and Games

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Note on Terminology

The following terms and definitions, as used in this document, are adapted directly from **RFC 2119**:

MUST: This word indicates an absolute requirement.

MUST NOT: This phrase indicates an absolute prohibition.

MAY: This word indicates an optional course of action that is neither required nor prohibited.

SHOULD: This word indicates a recommended course of action that may in some circumstances be ignored, the full implications of which must be understood before implementing such a course of action.

SHOULD NOT: This phrase indicates a course of action that is not recommended, but in some circumstances is permitted, the full implications of which must be understood before implementing such a course of action.

Addenda

Addendum to [Requirement 1.6](#), Baseline Technologies - Client-Side Scripts

In the case that a third-party script cannot easily be implemented unobtrusively, permission to use inline scripts or script elements **MUST** be requested from CHIN.

Addendum to [Requirement 4.16](#), Feedback Mechanism

If the product is **not** hosted on CHIN's server, it **MUST NOT** connect to CHIN's Anti-Spam API. Only products that are hosted on CHIN's server **MUST** connect to CHIN's Anti-Spam API.

Addendum to [Requirement 5.9](#), Video/Moving Images

CHIN's Akamai video streaming service is available **only** to products that are hosted on CHIN's server. If the product is **not** hosted on CHIN's server, it **cannot** make use of CHIN's video streaming service.

Addendum to [Requirement 5.15](#), Audio/Sound

CHIN's Akamai audio streaming service is available **only** to products that are hosted on CHIN's server. If the product is **not** hosted on CHIN's server, it **cannot** make use of CHIN's audio streaming service.

1.0 Markup, Presentation, and Scripting

Baseline Technologies

To ensure that the product's content will be available to the greatest number of visitors regardless of the technical configuration of their system or device:

XHTML 1.0 Strict

- 1.1 The product and all of its pages **MUST** use [XHTML 1.0 Strict](#) for the semantic and structural markup of Web page content. The **Frameset** and **Transitional** variants of XHTML 1.0 **MUST NOT** be used.

Note: It is important to understand the issues involved in serving XHTML as HTML (MIME type "text/html") as opposed to XML (MIME type "application/xhtml+xml"). For more on these issues, see the W3C's document, [XHTML Media Types](#), as well as the W3C tutorials, [Character sets & encodings in XHTML, HTML and CSS](#), and [Serving XHTML 1.0](#). Products that will **not** be hosted on CHIN's server **MAY** serve the product's pages as "application/xhtml+xml" to compatible user agents. However, CHIN's server sends all XHTML as "text/html."

- 1.2 The product and all of its pages, including XHTML markup generated or modified dynamically by client-side DOM scripts, **MUST** validate against the [W3C-published Document Type Definition \(DTD\)](#) for [XHTML 1.0 Strict](#).

Cascading Style Sheets (CSS)

- 1.3 Presentation and style (i.e., visual layout and design) **MUST** be applied through the use of valid [Cascading Style Sheets \(CSS\)](#).

Note: [CSS1](#), [CSS 2.1](#), and [CSS3](#), for which the W3C provides a [validator](#), **MAY** be used. It is not required that every browser be provided the same CSS presentation of the product's content. In some cases, it may be preferable to not send any CSS at all to certain browsers, e.g., Netscape 4.x, Internet Explorer 4.x for Windows and 5.x for the Mac.

- 1.4 CSS **MUST** be completely separate from page content and structure, and referenced as external files from within a page's `head` element. Inline or embedded styles **MUST NOT** be used.

Note: CSS rules generated dynamically by client-side DOM scripts **SHOULD NOT** be written inline. Instead, class names **SHOULD** be dynamically added to the relevant XHTML elements, thus invoking the associated CSS rules contained in an external stylesheet.

Client-Side Scripts

- 1.5 Client-side scripts **MUST** bind to the [W3C DOM](#) and be compliant with [ECMAScript, version 3 \(ECMA-262\)](#).

Note: The `innerHTML` property and `XMLHttpRequest` object are exceptions to the above rule and **MAY** be used.

- 1.6 Client-side scripts **MUST** be unobtrusive, completely separate from page content and structure, and referenced as external files from within a page's `head` element. Inline or embedded client-side scripts **MUST NOT** be used.

Note: Inline event handlers (e.g., `onclick`, `onfocus`) in the XHTML layer are prohibited. Event handlers **MUST** be dynamically written to the DOM using valid, unobtrusive DOM-scripting techniques.

- 1.7 Client-side scripts **MUST** test for and execute based on the user agent support for the critical DOM objects implemented in the scripts, as opposed to testing for user agent strings or otherwise "browser sniffing."

Character Encoding

- 1.8 Every product page **MUST** use and declare **UTF-8** character encoding.

Note: For a discussion of the issues with character encoding and serving XHTML documents, see the W3C tutorial, [Character sets & encodings in XHTML, HTML and CSS](#).

Secure Sockets Layer (SSL)

- 1.9 The product **MUST** use the [Secure Sockets Layer \(SSL\)](#) protocol when users are required to input a username and password (i.e., log in), or when any personal information (including, but not limited to, name, address, age, email address, telephone number, and credit card number) is solicited from a user and to be stored by the product and kept for use by the institution responsible for the product.

Note: It is not necessary to use SSL when gathering information through form-based email feedback, nor when soliciting a user's nickname only, for example, to store a high score in an online game.

- 1.10 All hyperlinks on SSL pages to non-SSL pages **MUST** use absolute URLs.

2.0 Accessibility

W3C Web Content Accessibility Guidelines 2.0

To ensure that the product's core content and functionality are available to the greatest number of visitors:

- 2.1 The product **MUST** conform to Level A and Level AA Success Criteria of the [Web Content Accessibility Guidelines \(WCAG\) 2.0](#), with the exception of Success Criteria [1.2.4](#) regarding captions for live media, and [1.2.5](#) requiring audio descriptions.

Note: In accordance with Level A Success Criteria [1.2.1](#), [1.2.2](#), and [1.2.3](#), audio-only clips **MUST** have text transcripts; video-only clips **MUST** either have a transcript or an audio track describing the important visual information; and synchronized multimedia clips **MUST** include synchronized captions as well as a full text transcript or audio description.

It is acknowledged that, as of November 2008, WCAG 2.0 remains a W3C Candidate Recommendation. However, WCAG 2.0 is set to become a full W3C Recommendation by 2009, is already better suited to the use of current technologies, and will help to ensure the accessibility of the product into the future. Any differences between the current and final versions of WCAG 2.0 will likely be minor and have minimal impact.

Progressive Enhancement

- 2.2 Following the [progressive enhancement](#) approach to Web design, the first content format that a user encounters **MUST** be the most accessible, unless the user's system configuration is compatible with and prepared to accept content in more enhanced formats.

Note: For example, in the case of an interview between two people, such content might be presented by default to all users as an accessible still image of the two individuals, accompanied by a full text transcript; while, in the case that a user's browser has JavaScript enabled and the Flash Player installed, the default image might be dynamically replaced by a captioned Flash video of the interview.

- 2.3 The product's main version **MUST** be accessible; that is, the site's accessibility **MUST NOT** be accommodated through the provision of a secondary (e.g., text-only) version of the site.

Script Independence

- 2.4 The product's core content and functionality **MUST** be available without client-side scripts.

Note: Presentational or behavioural enhancements implemented solely through client-side

scripts are permitted, but the product's core content and functionality **MUST** remain in the case that client-side scripts are disabled or not supported.

CSS Independence

- 2.5 The product's core content and functionality **MUST** be available without Cascading Style Sheets (CSS).

3.0 Directories, Files, and URLs

File and Directory Structure

- 3.1 Publicly available product files (e.g., XHTML, images, CSS, JavaScript) that are common to all language versions of the product **MUST** be placed in unique directories located in the product's top or root level directory, and **MUST NOT** be duplicated for each language version of the product.
- 3.2 Directory browsing **MUST** be disabled.

File and Directory Names

- 3.3 The names of publicly available files and directories **MUST** use only the following characters:

- lower-case letters (i.e., a–z)
- numbers (i.e., 0–9)
- hyphen (-)
- underscore (_)

Note: The hyphen (-) is a reserved character that **MUST NOT** be used except as a separator between equivalent bilingual words, phrases or abbreviations, and the ISO-639-2 three-letter code. Hyphens occurring naturally in words or phrases **MUST** be omitted and the resulting space collapsed, e.g., “avant-garde” becomes “avantgarde.” Spaces occurring naturally in phrases **MUST** be replaced by an underscore character (_), e.g., “new events” becomes “new_events.”

- 3.4 The names of directories whose contents are publicly available **MUST** comprise either
- a French word, phrase or abbreviation, followed by a hyphen and an equivalent English word, phrase or abbreviation; or,

- a single word or abbreviation that is the same in both languages.

Examples:

- /histoire-history/
- /images/
- /contes_aborigenes-native_stories/
- /ca-ns/

3.5 The names of publicly available files **MUST** comprise either

- a French word, phrase or abbreviation, followed by a hyphen and an equivalent English word, phrase or abbreviation, followed by a hyphen and the ISO-639-2 three-letter code (i.e., “fra” and “eng”) reflecting the linguistic version of the file; or,
- a single word or abbreviation that is the same in both languages, followed by a hyphen and the ISO-639-2 three-letter code (i.e., “fra” and “eng”) reflecting the linguistic version of the file.

Examples:

- index-fra.html
- index-eng.html
- entete-header-fra.swf
- entete-header-eng.swf
- logo-fra.jpg
- logo-eng.jpg
- liste_de_membres-members_list-fra.html
- liste_de_membres-members_list-eng.html
- lm-ml-fra.html
- lm-ml-eng.html

3.6 The names of publicly available files whose content is the same for both French and English versions of the product (e.g., certain images, media, JS and CSS files) **MUST** comprise either

- a French word, phrase or abbreviation followed by a hyphen and an equivalent English word, phrase or abbreviation;
- a single word or abbreviation that is the same in both languages; or,
- a language-neutral numeric or alphanumeric string.

Note: No three-letter language code is required for files whose content is the same in both official languages. Proprietary or third-party support files, e.g., “jquery-1.2.6.min.js,” **SHOULD NOT** be modified according to the above naming conventions.

Examples:

- ferme-farm.jpg
- artefact.jpg
- aaD77980017.jpg
- couleur-colour.css
- deroulant-pulldown.js
- intro.swf

3.7 All of the product’s static XHTML files **MUST** use the “.html” suffix, and **MUST NOT** use the “.htm” suffix.

URLs

Home Page URLs

- 3.8** The URLs for the language-selection “splash” page and the unilingual home pages (see requirements [4.1](#) and [4.2](#)) **MUST NOT** include any URL query string name/value parameters.

Relative URLs

- 3.9** All URLs for product pages and resources **MUST** be relative (i.e., not absolute), with the exception of URLs used in hyperlinks from SSL-secured pages to non-SSL-secured pages (see [requirement 1.9](#)).

4.0 Navigation, Layout and Design

Navigation

Language Navigation

- 4.1** The default page at the product’s root directory **MUST** act as the product’s language-selection “splash” page and include a hyperlink to the unilingual home page for each language version of the product (see [requirement 4.2](#)).
- 4.2** The product **MUST** include a unilingual home page for each language version of the product.
- 4.3** Every product page **MUST** include a hyperlink to the product’s other language version(s). This hyperlink **MUST** be visible without scrolling the page at a screen resolution of 1024 x 768 pixels, and direct the user to the same page in the other language.

Home Page Navigation

- 4.4** Every product page **MUST** include a hyperlink to the unilingual home page in the relevant language.

Secondary/Pop-up Windows

- 4.5** The product **MUST NOT** open links in new windows or tabs except for in the following

situations:

- Opening a page containing context-sensitive information (such as help instructions), or an alternate means of completing a form field (such as a calendar-based date picker), in the same window or tab will significantly disrupt a multi-step workflow (such as filling in and submitting a form).
- Opening a page outside a secure session in the same window or tab will break or destroy the current secure session.

Note: Users must be warned if a link will open in a new window or tab.

Product Title

- 4.6** Every product page **MUST** include the product's main title as XHTML text to identify the page's content as part of the product.

Note: Flash files or images **MAY** be used to replace the XHTML text version of the product's main title, but **MUST NOT** prevent assistive technologies from accessing the replaced text.

VMC Logo

- 4.7** Every product page **MUST** display the VMC logo image in the page's top right-hand corner and without any image border.

Note: CHIN will provide a copy of the VMC logo upon request. Different versions of the logo are available for greater compatibility with various visual designs.

- 4.8** The VMC logo **MUST** be implemented using the following XHTML code to load and hyperlink the logo image:

English

```
<a href="http://www.virtualmuseum.ca/English/"></a>
```

French

```
<a href="http://www.museevirtuel.ca/Francais/"></a>
```

Note: Replace the `src` attribute in the code above with the correct filepath for the logo image used in the product.

- 4.9** The VMC logo image **MUST NOT** form part of a client-side image map or CSS background-image without CHIN's express approval.

Copyright

- 4.10** The product **MUST** include, in the form of a separate Web page for each language version, a “Copyright” page featuring a full copyright statement identifying all rights holders.
- 4.11** The copyright symbol, ©, the copyright holder, and the year in which the product was launched, **MUST** appear on each product page and hyperlink to the full copyright statement (see [requirement 4.10](#)), for example:

© Museum of History 2005. All Rights Reserved.

Note: If the institution holding the copyright is officially bilingual, use the institution’s English name in the English version of the product, and the institution’s French name in the French version. If the institution is unilingual, use the same unilingual name in each language version.

Credits

- 4.12** The product **MUST** have a “Credits” page to which there is a hyperlink from both the language selection “splash” page and each unilingual home page.
- 4.13** The “Credits” page must acknowledge the financial participation of the Government of Canada as follows:

English

The [Name of Institution] gratefully acknowledges the financial investment by the Department of Canadian Heritage in the creation of this online presentation for the Virtual Museum of Canada.

French

Le [Nom de l'établissement] exprime sa reconnaissance au ministère du Patrimoine canadien pour son investissement financier dans la création de cette présentation en ligne dans le cadre du Musée virtuel du Canada.

- 4.14** The “Credits” page **MUST** name and provide hyperlinks, if available, to all institutional partners involved with the product.

Feedback Mechanism

- 4.15** Every product page **MUST** include a hyperlink to a simple XHTML form that allows for audience feedback. The feedback form **MUST** be configured to send an email both to the institution responsible for the product, and to CHIN (at vmccc@virtualmuseum.ca for the English version of the product, and mvccc@museevirtuel.ca for the French version), with a clear identification of the product in the subject line.

Note: CHIN will provide, upon request, a customized URL to the VMC's feedback form that can be used for the product's feedback mechanism.

- 4.16** The product's feedback mechanism **MUST** connect to CHIN's Anti-Spam API prior to sending feedback in order to verify that the feedback message being sent is not spam or from a questionable source.

Note: Documentation for CHIN's Anti-Spam API will be provided to successful applicants. If the product uses the VMC feedback form, the functionality of CHIN's Anti-Spam API is included by default.

- 4.17** Users **MUST** be advised that their feedback messages are also being forwarded to CHIN, and be provided with a hyperlink to the CHIN Privacy Policy (see the example below). Alternatively, information that identifies the user **MAY** be stripped from the feedback.

English Message Example

Your comments will also be forwarded to the Canadian Heritage Information Network (CHIN), which has overall responsibility for the Virtual Museum of Canada, to be used as part of its audience research. Please see the [CHIN Privacy Policy](#) for more information.

French Message Example

Vos commentaires seront également acheminés au Réseau canadien d'information sur le patrimoine (RCIP), qui a la responsabilité globale du Musée virtuel du Canada. Ils seront utilisés à des fins de recherche sur le public. Veuillez consulter la [Politique du RCIP sur la protection des renseignements personnels](#) pour de plus amples renseignements.

CHIN Privacy Policy URL — English

<http://www.virtualmuseum.ca/English/Common/copyright.html#privacy>

CHIN Privacy Policy URL — French

<http://www.museevirtuel.ca/Francais/Common/copyright.html#privacy>

- 4.18** Users **MUST** be advised of the privacy issues associated with sending feedback through email by being provided the following notice:

English

The Internet is a public forum and electronic information can be intercepted. For reasons of security and privacy, we ask that you not send us any personal or confidential information, such as your Social Insurance Number (SIN), home or business address.

French

Internet est un forum public et l'information électronique peut être interceptée. Pour des raisons de sécurité et de respect de la vie privée, nous vous demandons de ne pas nous faire parvenir de renseignements personnels ou confidentiels, tels votre numéro d'assurance sociale, l'adresse de votre domicile ou de votre bureau.

Site Map

- 4.19** The product **MUST** include, in the form of a separate Web page for each language version, a site map (i.e., a hierarchically organized or nested list of hyperlinks to all of the major sections and pages of the product at least two directory levels deep) that uses text hyperlinks, as opposed to graphical hyperlinks or buttons.

Note: To increase the ability of search engines to properly index all product pages, it strongly suggested that the product also implement an [XML Sitemap](#).

- 4.20** Every product page **MUST** include a text hyperlink to the site map in the appropriate language to help ensure that human users and search engines can find every page of the product.

title Element

- 4.21** Every product page **MUST** include, within its head element, a title element containing a meaningful and keyword-rich title that is no more than 60 characters in length and unique to that page's content.

NOTE: As the single most important page element from the perspective of search engine optimization (SEO), the title element's content **SHOULD** be written from most specific to least specific, with the unique page title coming first, and the product's main title last, e.g., "About Dr. Neville | Doctors in the North."

meta "description" Element

4.22 Each unilingual home page **MUST** include within its head element a meta "description" element containing a meaningful and keyword-rich description that is no more than 150 characters in length and that describes the product's content as a whole.

Note: If other product pages include a meta "description" element, it **MUST** be specific and unique to the page's content.

meta "keywords" Element

4.23 Product pages **MAY** include within their head element a meta "keywords" element containing a list of keywords and keyphrases that **MUST** be specific and unique to the page's content.

Banners, Headers and Footers

4.24 The product **MUST NOT** use corporate- or institution-branded Web site navigational elements, such as banners, headers or footers, without CHIN's express approval.

Web Analytics

4.25 If the product will **not** be hosted on CHIN's server, every product page **MUST** include a special JavaScript file and `noscript` element as provided by CHIN to collect visitor statistics for the product.

Note: CHIN will provide successful applicants with the product-specific JavaScript file and `noscript` element code, as well as explicit directions for their implementation. If the product will be hosted on CHIN's server, the collection of visitor statistics for the product will be enabled by default, and no additional JavaScript file or `noscript` element is required.

5.0 Content Types and Formats

Plug-ins and Specialized Software

If any product content requires a plug-in or specialized software in order to be viewed:

- 5.1** A plug-in or specialized software capable of presenting the content **MUST** be freely available for all platforms (i.e., Windows, Mac, and Linux).

Note: For example, since Windows Media Player 10 does not work natively on the Mac or Linux platforms, either additional directions to download an equivalent media player for Mac and Linux are provided, or the plug-in/specialized software indicated is compatible with all three platforms, e.g., [VLC](#).

- 5.2** The content that requires a plug-in or specialized software **MUST** be accompanied by a text indication of its format, file type, and file size.

- 5.3** A hyperlink to the source of a relevant plug-in or specialized software **MUST** be provided from each page on which a plug-in or specialized software is needed to access the content.

Text

- 5.4** All text-based content **MUST** be presented primarily as text in [XHTML 1.0 Strict](#).

Note: While all text-based content **MUST** be displayed as XHTML, such content **MAY** additionally be developed in another format for viewing or printing with the use of plug-in software freely available for all platforms. An example of this type of format is Adobe's [PDF](#), for which the Adobe PDF viewer, [Adobe Reader](#), is available for all platforms.

Still Images

- 5.5** All still-image graphics **MUST** be optimized and enhanced for the Web to reduce file size and download time:

- Line-drawn graphics **MUST** use the GIF or PNG formats.
- Photographs, high resolution, and continuous tone images **MUST** use the JPEG (24-bit) format.

Note: Exemptions to this requirement **MAY** be granted by CHIN in certain situations where the use of proprietary solutions is needed to meet project objectives.

- 5.6** All hyperlinks to image files greater than 100KB in size **MUST** be accompanied by a text indication of the file's size in order to alert users.
- 5.7** Product pages **MUST NOT** initiate the download of full-size content image files unless the user has expressly requested it.

Note: This requirement is intended to restrict the development of pages that include both image thumbnails and their associated full-size versions that are hidden via CSS until the user sets focus to the thumbnail. Such pages are usually very large, require more bandwidth, and force the user to download content in which they have not expressly signalled an interest.

Video/Moving Images

- 5.8** Video files **MUST NOT** be larger than 4MB in size.
- 5.9** If a video file is prepared for delivery in a high-bandwidth environment, an alternate low-bandwidth version **MUST** also be prepared and provided to users.

Note: Some streaming systems allow producers to prepare a single video file that can be played at various streaming speeds corresponding to multiple Internet access speeds. In cases where such systems are used, a single version of a video file is sufficient.

CHIN regularly contracts media streaming services from [Akamai](#). If the product is to use video, it might be possible for it to use these services. For more information, contact CHIN.

- 5.10** Video files that are loaded into a browser-embedded player **MUST NOT** start automatically, and the player **MUST** include controls for starting and stopping the video.
- 5.11** Non-streaming video files that are loaded into a browser-embedded player **MUST** be accompanied by a direct hyperlink to the video file itself, enabling users to access it without having to rely on the browser-embedded player.
- 5.12** All hyperlinks to streamed video files **MUST** be accompanied by a text indication of the streamed file's duration.
- 5.13** Where a codec is used to compress video file content, the codec **MUST** be included in a standard platform or package, or be freely-available for installation by users. A hyperlink to the codec **MUST** be provided for users who need to download and install it.

Audio/Sound

- 5.14** Audio files **MUST NOT** be larger than 4MB in size.

- 5.15** If an audio file is prepared for delivery in a high-bandwidth environment, an alternate low-bandwidth version **MUST** also be prepared and provided to users.

Note: Some streaming systems allow producers to prepare a single audio file than can be played at various streaming speeds corresponding to multiple Internet access speeds. In cases where such systems are used, a single version of an audio file is sufficient.

CHIN regularly contracts media streaming services from [Akamai](#). If the product is to use audio, it might be possible for it to use these services. For more information, contact CHIN.

- 5.16** Audio files that are loaded into a browser-embedded player **MUST NOT** start automatically, and the player **MUST** include controls for starting and stopping the audio.
- 5.17** Non-streaming audio files that are loaded into a browser-embedded player **MUST** be accompanied by a direct hyperlink to the audio file itself, enabling users to access it without having to rely on the browser-embedded player.
- 5.18** All hyperlinks to streamed audio files **MUST** be accompanied by a text indication of the streamed file's duration.
- 5.19** Where a codec is used to compress audio file content, it **MUST** be included in a standard platform or package, or freely-available for installation by users. A hyperlink to the codec **MUST** be provided for users who need to download and install it.

Animations

- 5.20** Animation (e.g., Flash animation) files **MUST NOT** be larger than 4MB in size.
- 5.21** All hyperlinks to animation (e.g., Flash animation) files greater than 100KB **MUST** be accompanied by a text indication of the file's size.
- 5.22** All animation (e.g., Flash animation) files greater than 25KB **MUST**, while being downloaded to the client application (e.g., Flash Player), present a continually updating progress indicator ("preloader") showing the degree to which the file has been downloaded.

6.0 Dublin Core (DC) Metadata

DC Metadata Elements

- 6.1** The **Title, Creator, Subject, Date, Identifier, and Language** metadata elements from the

Dublin Core Metadata Element Set, Version 1.1 **MUST** be included on the following pages:

- the product's unilingual home pages;
- the main page for every major section of the product; and,
- pages featuring resources for which there is sufficient context and meaning and which are worth listing in a search engine.

Note: DC metadata content for English pages or resources **MUST** be in English, while metadata content for French pages or resources must be in French.

Implementing Metadata

6.2 DC metadata **MUST** be embedded within the `head` element of the page to which it applies.

Note: For help implementing DC metadata, see the [CCO Best Practice Guide on Metadata](#) and the [Government of Canada Metadata Implementation Guidelines for Web Resource Discovery](#).

Unique Metadata

6.3 Each page described by DC metadata **MUST** feature a unique set of metadata.

Note: Copying and pasting the same metadata content is bad practice. No two Web pages should have the same Identifier, Title, or Subject.

7.0 CHIN Server and Database Technical Specifications

CHIN Server Environment

7.1 Products that will be hosted on CHIN's server **MUST** be developed for and in accordance with the following environment specifications:

Server

- UNIX — Sun Solaris 10
- Apache 2.2.4
- Static XHTML pages **MUST** use the ".html" suffix.

CGI and PERL

- CGI scripts **MUST** use the ".cgi" suffix, and **MAY** be located anywhere in the product's directory structure.
- PERL 5.8.8 is enabled.
- Most standard PERL modules are available, for example, CGI, DBI.
- PERL and CGI scripts **MUST** begin with the following "shebang" notation:

```
#!/usr/local/bin/perl
use strict;
```

PHP

- PHP 5.2.2 is enabled.
- PHP scripts **MUST** use the ".php" suffix.
- PHP scripts **MAY** be located anywhere in the project's directory structure.
- The "register_globals" directive is set to OFF.
- PHP access to MySQL is enabled.
- PHP support for XML is enabled.
- The addition of PHP extensions will be decided by CHIN on a case by case basis. If you are interested in using a particular PHP extension, enquire with CHIN.

Server Side Includes (SSI)

- Any XHTML page with the ".html" suffix and the execute bit set will be parsed for Server Side Includes (SSI).

Database

- MySQL 5.0.41
- Direct access to the MySQL database management system (DBMS) will be granted by special permission only. In the case that permission is granted, access will be available through a SSH/command line interface.
- The Department of Canadian Heritage network policy does not permit the use of graphical interfaces for connecting to the database server from outside of the departmental network.
- For the creation of the database structure or the loading of table data, a MySQL-compliant SQL file **MAY** be sent to CHIN for loading onto the DBMS.

Note: Products that will not be hosted on CHIN's server **SHOULD** be developed in accordance with the specifications for the CHIN server environment as the product may eventually be hosted on CHIN's server.

Script Validation

7.2 If the product will be hosted on CHIN's server, PHP and PERL scripts **MUST** adhere to the following validation rules:

- All parameters passed to scripts **MUST** be validated before they are used.
- All local variables **MUST** be explicitly initialized before they are used.

- Parameters that may only contain values from constrained sets **MUST** be validated to ensure that their values are within those constrained sets.
- Parameters **MUST** be validated to ensure that their values are of the expected type. For example, if a parameter is to contain only numbers, the value passed must validate as numeric.
- Parameters used as criteria for dynamically generated SQL statements **MUST NOT** contain unescaped apostrophes.
- Included/required files **MUST** be validated to ensure that their file paths exist on the host server.
- Included/required files **MUST** be validated to ensure that they are files.

Note: See "**CGI and PERL**" and "**PHP**" under **requirement 7.1** above for the latest versions of PERL and PHP in use on CHIN's server.

Database Design

Connection Strings

- 7.3** All database connection strings **MUST** be abstracted from the product and stored only once within a file outside of the product's root directory in a location unavailable to the Web server.

DBMS

- 7.4** If the product employs a database and will be hosted on CHIN's server, the database **MUST** use the MySQL Database Server database management system (DBMS).

Note: See "**Database**" under **requirement 7.1** above for the latest version of MySQL in use on CHIN's server.

Normalization

- 7.5** If the product employs a database and will be hosted on CHIN's server, logical data models **MUST** be in third normal form (3NF). That is, all attributes of a particular relational table must be functionally dependent on the entire primary key.

Note: In the logical data model, a candidate key that is comprised of real attributes **SHOULD** be used for the primary key. An autoincrement, or other form of artificial key, **MAY** be used in the physical data model. Tables **MAY** be denormalized in physical data models for performance reasons, but these exceptions **MUST** be justified to CHIN with quantitative evidence, e.g., how much faster is the denormalized structure.

Naming Standards

- 7.6** If the product employs a database and will be hosted on CHIN's server, the following database naming standards **MUST** be followed:
- Databases **MUST** have both a descriptive name and a short abbreviation (max. 5

characters).

- Tables **MUST** have both a descriptive name prefixed with the database abbreviation, and a short abbreviation (max. 5 characters).
- Fields **MUST** have a descriptive name prefixed with their table abbreviation.
- Views **MUST** have a descriptive name prefixed with their database abbreviation.
- Index names **MUST** begin with a "U" for unique indices or "S" for non-unique indices, followed by the table abbreviation, followed by the name of each field that participates in the index.
- Trigger names **MUST** begin with a "T", followed by a "B" (Before) or "A" (After) to indicate timing, followed by a "D" (Delete), "I" (Insert), or "U" (Update) to indicate the trigger event, and finally followed by the table name.

Data Dictionary

- 7.7** If the product employs a database and will be hosted on CHIN's server, all database elements (database, table, field, index, view, trigger, etc.) **MUST** have a name, caption, and description. Fields **MUST** also have data type and default value information.

Note: The description of views **SHOULD** include the view definition, and the description of triggers **SHOULD** include annotated source code.

- 7.8** If the product employs a database and will be hosted on CHIN's server, any information that is stored in the database and that indicates product usage **MUST** have an associated timestamp value for tracking and verification purposes.